REMARKS

1. Claims

Applicants note the withdrawal of the prior-art rejections over U.S. Pat. No. 5,932,799. Claims 1 – 11 and 16 stand rejected under 35 U.S.C. §112, ¶1 as failing to comply with the enablement requirement. The rejections are respectfully traversed. Claim 5 has been amended to correct a typographical error to refer to a "bottom surface" rather than to a "bottom recess"; it is believed that this error, and the correct interpretation, would have been apparent to one of ordinary skill in the art. Claim 8 has been amended to correct an informality; this amendment does not change the scope of the claim.

The Office Action states that "[f]urther review of the specification, particularly Figures 72 and 75 of the drawings, is not considered to disclose the invention as recited in claims 1, 11 and 16, particularly a first and second elastomer layer bearing in a first and second recess, respectively, the second recess having an arched ceiling." Applicants note that independent Claim 1 recites "the first elastomer layer bearing in a bottom surface a first recess" and "the second elastomer layer bearing in a bottom surface a second recess having an arched ceiling." For each elastomer layer the respective recess is required to be borne in a bottom surface of the respective elastomer layer. This is also true for independent Claims 5 and 16, with Claim 16 reciting similar language and Claim 5 reciting "a bottom surface of the first elastomer layer bearing a first recess" and "a bottom surface of the second elastomer bearing a second recess."

With respect to Claim 1, the Examiner's attention is drawn to the description of Fig. 72 in the specification:

> In a further alternative aspect, the control channel may be positioned underneath a flow channel having an arched ceiling, such that deflection of the membrane causes the membrane to bow upwards and conform to the arched ceiling of the flow channel, thereby ensuring a good seal. Fig. 72 shows a cross-sectional view of such an alternative valve structure 7700, wherein control channel 7702 is formed in first elastomer layer 7704 in contact with underlying substrate 7706. Second elastomer layer 7708 containing flow channel 7710 is positioned over first elastomer layer 7704, such that flow channel 7710 is orthogonal to underlying control channel.
>
> Fig. 72 shows that membrane portion 7712 defined between control channel 7702 and flow channel 7710 can be deflected into flow channel 7710 to conform to the arched shape of

> ceiling 7710a of flow channel 7710. Conformity of the actuated membrane 7712 with the shape of the flow channel ceiling prevents leakage of materials through the closed valve and helps ensure linear response of the valve.
> (Application, p. 36, ll. 7 – 19).

This description alone, but even more so together with Fig. 72, unequivocally provides an enabling disclosure of each element of Claim 1. In particular, the embodiment of Fig. 72 includes an "underlying substrate" 7702 over which is formed "a first elastomer layer" designated by reference number 7704. A bottom surface of this first elastomer layer bears "a first recess" 7702 that acts as a control channel and within which fluid may flow in a left/right direction in the page. Over the first elastomer layer is formed "a second elastomer layer" designated by reference number 7708. A bottom surface of this second elastomer layer bears "a second recess" 7710 that has "an arched ceiling" 7710a and that acts as a flow channel within which fluid may flow in a direction orthogonal to the page. A top portion of the first elastomer layer acts as "a membrane portion" 7712 defined between the first and second recesses and is described in the specification as deflectable upward into the second recess to conform with and seal against the arched ceiling (Application, p. 36, ll. 15 – 17).

With respect to Claim 5, the Examiner's attention is drawn to the description of Fig. 75 in the specification:

> Fig. 75 presents a cross-sectional view of a microfluidic structure in accordance with one embodiment of the present invention, which is formed from three elastomer layers on top of a substrate. Specifically, elastomer device 8000 comprises first elastomer layer 8002 overlying planar substrate 8004 and bearing first recessed control channel 8006. Second elastomer layer 8008 overlies first elastomer layer 8002, and recessed flow channel 8010 of second elastomer layer 8008 is separated from first control channel 8006 by first membrane 8010.
>
> Third elastomer layer 8012 overlies second elastomer layer 8008 and bears second recessed control channel 8014 separated from underlying flow channel 8010 by second membrane 8016. The arrangement of elastomer layers just shown allows control channels 8006 and 8014 to operate independently to control the flow of material through flow channel 8010. The use of control channels both above and below the flow channel confers greater flexibility to the designer in routing of control signals.

This description alone, but even more so together with Fig. 75, unequivocally provides an enabling disclosure of each element of Claim 5. In particular, the embodiment of Fig. 75 includes an "underlying substrate" 8004 over which is formed a "first elastomer layer" designated by reference number 8002. A bottom surface of this first elastomer layer bears "a

first recess" 8006 that acts as a control channel and within which fluid may flow in a direction orthogonal to the page. Over the first elstomer layer is formed "a second elastomer layer" designated by reference number 8008. A bottom surface of this second elastomer layer bears "a second recess" 8010 that acts as a flow channel and within which fluid may flow in a left/right direction in the page. Over the second elastomer layer is formed a "third elastomer layer" designated by reference number 8012. A bottom surface of this third elastomer layer bears "a third recess" 8014 that acts as a control channel and within which fluid may flow in a direction orthogonal to the page. Deflectable membranes defined as portions of the first and second elastomer layers are visible in the drawing between the first and second recess, and between the second and third recess, respectively.

It is thus respectfully believed that every element of Claims 1 and 5, and corresponding elements of the other independent claims, is supported by an enabling disclosure.

2. Drawings

Formalized versions of Figs. 71A – 82C are being filed concurrently herewith. It is believed that these formalized versions obviate the objections to the drawings identified in the Office Action.

3. Interview

The undersigned thanks the Examiner for his time and courtesy in conducting a telephone interview regarding the Office Action on December 16, 2004. During the interview, sources of support for the claims was discussed, with the Examiner indicating that the above identifications of Figs. 72 and 75 are responsive to the §112 rejections.

Conclusion

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

Patrick M. Boucher
Reg. No. 44,037

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 303-571-4000
Fax: 415-576-0300
PMB/jln
60370220 v1